

AMENDMENTS TO THE SPECIFICATION:

Please amend the paragraph on page 1, line 16 through page 2, line 1 as follows:

Aqueous dispersion materials containing a functional substance are well known as functional materials, the functional ~~material~~ materials including pesticides such as herbicides, and insecticides; medicines such as carcinogenic agents, antiallergic agents, and antiphlogistic agents; and coloring materials such as inks and toners containing a colorant. In recent years, digital printing techniques are progressing remarkably. The digital printing technique is typified by electrophotography and ink-jet printing, and is becoming more and more important as image-forming techniques in offices and families.

Please amend the paragraph on page 3, line 1 as follows:

DISCLOSURE SUMMARY OF THE INVENTION

Please amend the paragraph on page 4, lines 5 through 8 as follows:

A second embodiment of the present invention is a method for liquid application, comprising a step of bringing the set of the liquid compositions of the first embodiment.

Please amend the paragraph on page 5, lines 3 through 9 as follows:

The present invention ~~provides also~~ also provides a liquid applying method for forming an image on a recording medium by use of the aforementioned liquid composition set without diffusion of the functional substances at the boundary between the fixation regions of the functional substances without causing blur.

Please amend the paragraph on page 5, line 23 through page 6, line 7 as follows:

The liquid-composition set of the present invention comprises a combination of two liquid compositions which causes viscosity increase of at least one of the liquid compositions on contact of the two liquid compositions at the contact portion. The liquid-composition set of the present invention may comprise a combination of more than two liquid compositions. For example, in a set comprising three liquid compositions, a first liquid composition and a second liquid composition satisfy the above conditions, and the second composition and a third composition satisfy the above conditions.

Please amend the paragraph on page 8, lines 8 through 27 as follows:

The water-soluble dyes include;

direct dyes such as ~~C.I. Direct Black-17, -62;~~ C.I. Direct Black-17, -62, -154; C.I. Direct Yellow-12, -87, -142; C.I. Direct Red-1, -62, -243; C.I. Direct Blue-6, -78, -199; C.I. Direct Orange-34, -60; C.I. Direct Violet-47, -48; C.I. Direct Brown-109; and C.I. Direct Green-59,
acid dyes such as C.I. Acid Black-2, -52, -208; C.I. Acid Yellow-11, -29, -71; C.I. Acid

Red-1, -52, -317; C.I. Acid Blue-9, -93, -254; C.I. Acid Orange-7, -19; and C.I. Acid Violet-49, reactive dyes such as C.I. Reactive Black-1, -23, -39; C.I. Reactive Yellow -2, -77, -163; C.I. Reactive Red-3, -111, -221; C.I. Reactive blue-2, -101, -217; C.I. Reactive Orange-5, -74, -99; C.I. Reactive Violet-1, -24, -38; C.I. Reactive Green-5, -15, -23; and C.I. Reactive Brown-2, -18, -33,

basic dyes such as C.I. Basic Black-2; C.I. Basic Red-1, -12, -27; C.I. Basic Blue-1, -24; C.I. Basic Violet-7, -14, -27, and

C.I. Food Black-1, -2.

Please amend the paragraph on page 11, lines 11 through 19 as follows:

The aqueous liquid medium may be used at any pH level. Preferably, the pH is in the range from 1 to 14. The content of the liquid medium in the present invention is in the range range from 0.9 to 99 mass%, preferably from 10 to 99 mass%. At the content of lower than 0.9 mass%, the viscosity of the composition tends to be extremely high, whereas at the content of higher than 99 mass%, the functional substance is liable not to perform its function.

Please amend the paragraph on page 12, lines 10 through 22 as follows:

The block polymer, also called a block copolymer, is constituted of polymers of different segment structures linked together in a chain by a covalent bond. The graft polymer is constituted of a backbone polymer and a branch polymer grafted to the backbone polymer. For

example, when the backbone polymer and the branch polymer have different affinity to the medium, the graft polymer can be amphiphilic. The graft polymer is ~~called also~~ also called a graft copolymer. Typically a graft polymer has constitution in which a different polymer segment is bonded to a backbone polymer by covalent bond in a shape of "T".

Please amend the paragraph on page 14, lines 2 through 26 as follows:

A block polymer containing a polyalkenyl ether structure is preferably used in the present invention. More preferably a block polymer containing a polyvinyl ether structure is used. Various methods are reported for synthesis of the block polymer containing the polyalkenyl ether structure useful in the present invention. A typical method is a cationic living polymerization reported by ~~Aosima et al.~~ Aoshima et al. (Polymer Bulletin, ~~vol.15~~, Vol. 15, 1986, ~~p.417~~ p. 417; Japanese Patent Application Laid-Open Nos. 11-322942 and 11-322866). Cationic living polymerization enables synthesis of various polymers with precisely uniform chain lengths (molecular weights), the polymers including homopolymers, copolymers constituted of two or more kinds of monomers, block polymers, graft polymers, and graduation polymers. To the polyalkenyl ether structure, a functional group can be introduced at the side chain portion. The cationic polymerization can also be conducted with a catalyst system of HI/I_2 , HCl/SnCl_4 , and so forth.

Please amend the paragraph on page 18, lines 4 through 25 as follows:

The functional substance contained in the liquid composition is preferably enclosed by the block or graft polymer for preventing deterioration caused by environmental conditions. An amphiphilic block or graft polymer, which is capable of enclosing readily the functional substance by formation of self-assembly structure, is effective in this respect. The block or graft polymer molecule is preferably flexible for higher dispersion stability and higher enclosing ability, since the flexible polymer molecule readily twine physically around the functional material surface. The flexibility of the polymer molecule is desirable also in view of ease of formation of a coating layer on a recording medium, as described later. For this purpose, the main chain of the block polymer has its glass transition temperature (T_g) preferably of not higher than 20°C, more preferably not higher than 0°C, still more preferably not higher than -20°C. In this respect, the polymers having a polyvinyl structure are useful owing to low glass transition temperature and flexibility thereof.

Please amend the paragraph on page 19, lines 16 through 21 as follows:

The state of enclosure ~~is~~ can be confirmed by instrumental analysis such as electron microscopy, and X-ray diffraction. The enclosure in a micelle state can be indirectly confirmed by separation of the colorant and the polymer from the solvent under micelle collapse conditions.

Please amend the paragraph on page 20, lines 7 through 15 as follows:

The ratio of the functional substance enclosed by the block or graft polymer to the total

amount of the functional substance is preferably not less than 90 mass%, more preferably not less than 95 mass%, still more preferably not less than 98 mass%. This ratio can be measured by instrumental analysis such as electron microscopy, and X-ray analysis; color density analysis for colorants; and the aforementioned indirect method.

Please amend the paragraph on page 20, line 20 through page 21, line 9 as follows:

In the present invention, at least two kinds of liquid compositions are used, the compositions respectively containing a functional substance, a block or graft polymer and a liquid medium as described above. Typically as one of the embodiments of the present invention, an image forming method is provided in which colorants are used as the functional substances. In this method, when the two compositions are brought into contact on a recording medium, at least one of the liquid ~~composition~~ compositions responds to another liquid composition to cause viscosity increase to prevent diffusion of ~~the~~ both liquid compositions or to facilitate drying. Thus, the two liquid compositions are different from each other. Preferably the block or graft polymers are different, and respond to each other to cause change of the properties of the block or graft polymers.

Please amend the paragraph on page 39, line 24 through page 40, line 15 as follows:

As shown in Fig. 1, head driving circuit 60 is connected to head 70 in addition to X-direction driving motor 56 and Y-direction driving motor 58. CPU 50 controls head-driving

circuit 60 to drive head 70 to conduct ejection of an ink-jet ink and other operations. ~~X-encoder~~
62 X-encoder 62 and ~~Y-encoder 64~~ Y-encoder 64 for detection of the position of the head are
connected to CPU 50 to input the information on the position of head 70 to CPU 50. Into
program memory, a control program is installed. According to the position information from
~~X-encoder 62~~ X-encoder 62 and ~~Y-encoder 64~~, Y-encoder 64, CPU 50 moves head 70 onto an
intended position on the recording medium and drive the head to eject the ink-jet ink. In such a
manner, an image is recorded on the recording medium. With an image-recording apparatus
employing plural ink-jet inks, the above operation is conducted with each of the ink-jet inks
prescribed times to record an intended image on the recording medium

Please amend the paragraph on page 61, line 26 through page 62, line 6 as follows:

A portion of 15 mass parts of the block polymer (3), and 7 mass parts of a black pigment
(MOGUL-L, Cabot Co.) were mixed in 150 mass parts of dimethylformamide. Thereto 500
mass parts of distilled water was added to change the solution to be aqueous similarly as in the
above Examples. The pH of the aqueous mixture was adjusted to 10.4 with an aqueous KOH
solution to obtain an ink composition.